

NC Response Protocol

```

<response>  :=      <message><eol>

<message>   :=      <start>|<stop>|<execute>|<getwrk>|<quit>|<error>|<end>|<point>|
                  <toolballd>|<toolinfo>
<eol>        :=      <cr><lf>

<start>     :=      <'1'><white><machid><units><progid>
<stop>       :=      <'2'><white><machid>
<execute>    :=      <'3'><white><machid>
<getwrk>    :=      <'4'><white><machid><wrkoffset><x><y><z>
<end>        :=      <'9'><white><machid>
<point>      :=      <'10'><white><machid><featid><index>+
                  <x><y><z><a><b><c>
<toolballr> :=      <'11'><white><machid><probeid><tipid><effballr>
<toolinfo>  :=      <'12'><white><machid><probeid><tipid>+
                  <offsetx><offsety><offsetz><effballr>
<error>      :=      <errorid><machid>

<white>      :=      (' '|0x0b)$n ($n => repeat 0 or more times)
<machid>    :=      <integer><white>
<progid>    :=      <string><white>
<index>      :=      <integer><white>
<featid>    :=      <integer><white><integer><white> (High , low id number)
<wrkoffset> :=      <"G54"><"G55"><"G56"><"G57"><"G58"><"G59">
<probeid>   :=      <string><white>
<tipid>     :=      <string><white>
<x>          :=      <numberfield>
<y>          :=      <numberfield>
<z>          :=      <numberfield>
<a>          :=      <numberfield>
<b>          :=      <numberfield>
<c>          :=      <numberfield>
<offsetx>   :=      <numberfield>
<offsety>   :=      <numberfield>
<offsetz>   :=      <numberfield>
<effballr> :=      <numberfield>
<errorid>   :=      <pnf>|<unexphit>|<machine_err>
<units>      :=      <'I' | 'M'>

<integer>    :=      <digit>$k ($k => repeate 1 or more times)
<string>     :=      <">(<alphanumeric>$k)<">
<numberfield>:=      (<digit>$n)<white> | (<digit>$n)<.'>(<digit>$k)<white>

```

<vectorfield> := <numberfield> where the vector is normalized to $\|\text{vec}\| = 1$
<pnf> := <'91'><white>
<unexphit> := <'92'><white>
<machine_err>:= <'93'><white>
<units_mismatch> := <'95'><white>

<digit> := <'0'>|<'1'>|<'2'>|<'3'>|<'4'>|<'5'>|<'6'>|<'7'>|<'8'>|<'9'>
<alphanumeric> := all iso printable ascii characters including white space